

FORM PTO-1390 (REV. 1-98)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER M8540/260364
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371			U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
INTERNATIONAL APPLICATION NO. PCT/GB00/00141	INTERNATIONAL FILING DATE 11 January 2000 (11.01.00)	PRIORITY DATE CLAIMED 11 January 1999 (11.01.99)	
TITLE OF INVENTION SNATCH DISCONNECTION LANYARD			
APPLICANT(S) FOR DO/EO/US CRUTTENDEN, Michael James and GRIFFIN, Dennis			

Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:


- ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
- ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 37 (b) and PCT Articles 22 and 39(1).
- ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
- ☒ A copy of the International Application as published (35 U.S.C. 371(c)(2))
 - ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - ☐ has been transmitted by the International Bureau.
 - ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
- ☐ A translation of the published International Application into English (35 U.S.C. 371(c)(2)).
- ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - ☐ have been transmitted by the International Bureau.
 - ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - ☒ have not been made and will not be made.
- ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
- ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (unexecuted)
- ☐ A translation of the International Preliminary Examination Report under PCT Article 36
- ☐ An Information Disclosure Statement under 37 CFR 1.197 and 1.98
- ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
- ☒ A FIRST preliminary amendment.
 ☐ A SECOND or SUBSEQUENT preliminary amendment.
- ☐ A substitute specification.
- ☐ A change of power of attorney and/or address letter.
- ☒ Other items or information:
 - Certification Under 37 CFR 1.10

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Angela M. Rossi Angela M. Rossi

 - Marked up version of claims as amended
 - International Preliminary Examination Report with amended sheets 1, 1A, 2, 7, 8

JC05 Rec'd PCT/PTO 06 JUL 2001

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/869867		INTERNATIONAL APPLICATION NO. PCT/GB00/00141		ATTORNEY'S DOCKET NUMBER M8540/260364	
17. <input checked="" type="checkbox"/> The following fees are submitted BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1,000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT = \$860.00				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	11	00	X \$18.00	\$.00	
Independent claims	01	00	X \$80.00	\$.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00	\$.00	
TOTAL OF ABOVE CALCULATIONS =				\$860.00	
Applicant claims small entity status.				\$.00	
SUBTOTAL =				\$860.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$.00	
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Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property				\$.00	
TOTAL FEES ENCLOSED =				\$860.00	
				Amount to be refunded:	\$
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a. <input checked="" type="checkbox"/> Check in the amount of \$860.00 is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. 11-0855 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-0855.					
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Michael James
CRUTTENDEN and
Dennis GRIFFIN

SERIAL NO.: U.S. National Phase of PCT/GB00/00141 GROUP ART
UNIT:

FILED: 06 July 2001 EXAMINER:

FOR: SNATCH DISCONNECTION LANYARD

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Commissioner for Patents
Washington, D.C. 20231

ATTORNEY DOCKET NO.: M8540/260364
DATE: 06 July 2001

PRELIMINARY AMENDMENT

Sir:

Kindly amend the above-identified patent application prior to examination:

In the Claims

1. (Amended) A snatch disconnection lanyard assembly comprising a tensioner, whereby the tensioner may be set to allow paying out of the lanyard or set to pull in the lanyard and when set to pull in, will resist paying out of the lanyard, thereby providing a tensile force for snatch disconnection.
2. (Amended) A lanyard assembly as defined in claim 1 whereby when the tensioner is set to allow paying out the lanyard, pulling in of the lanyard by the tensioner is resisted.
3. (Amended) A lanyard assembly as defined in claim 1 comprising a tensioning cable attached to or comprising the lanyard.
4. (Amended) A lanyard assembly according to claim 3 whereby when in use, the tensioning cable is wound up onto and unwound from a reel which is spring biased to wind up the cable.

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5. (Amended) A lanyard assembly according to claim 4 comprising a mounting bracket, a housing for the reel and a flexible conduit extending between the bracket and the housing and through which the tensioning cable runs.
6. (Amended) A lanyard assembly according to claim 4 comprising a ratchet mechanism which can be set to resist rotation of the reel in the unwinding direction, thereby resisting paying out of the lanyard, but additionally and alternatively can be reset to resist rotation of the reel in the winding up direction, thereby allowing paying out of the lanyard and resisting pulling in of the lanyard while a snatch connection is made up.
7. (Amended) A lanyard assembly according to claim 6 whereby it is biased towards the set condition and is moved to the reset condition by rotation of a key inserted into the assembly, counter rotation of the inserted key being resisted by a further ratchet mechanism.
8. (Amended) A lanyard assembly according to claim 1 comprising a brake operable to resist paying out of the lanyard at above a predetermined speed.
9. (Amended) A lanyard assembly according to claim 1 comprising a resilient link connected to the lanyard, opposed parts of the link each carrying abutment faces, the respective abutment faces on either side being brought into contact with each other when the link has been deformed by a predetermined amount.
10. (Amended) A lanyard assembly as defined in claim 9 in which the abutments, when in contact, transmit tensile loads applied to the connector opposed parts.

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11. (Amended) A lanyard assembly according to claim 9 in which the lanyard has a plurality of ends attached to a connector half at spaced circumferential locations, the link comprising a spreader bar connected between a tensioning cable and the lanyard.

Respectfully submitted,



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Marked up version of claims
U.S. National Phase of PCT/GB00/00141

1. (Amended) A snatch disconnection lanyard assembly [(2,4,6,10,44,52)] comprising a tensioner [(2)], [characterised in that] whereby the tensioner [(2)] may be set to allow paying out of the lanyard [(4,6,10)] or set to pull in the lanyard [(4,6,10)] and when set to pull in, will resist paying out of the lanyard [(4,6,10)], thereby providing a tensile force for snatch disconnection.
2. (Amended) A lanyard assembly [(2,4,6,10,44,52)] as defined in claim 1 [characterised in that,] whereby when the tensioner [(2)] is set to allow paying out the lanyard [(4,6,10)], pulling in of the lanyard [(4,6,10)] by the tensioner [(2)] is resisted.
3. (Amended) A lanyard assembly [(2,4,6,10,44,52)] as defined in claim 1 [or 2 characterised in that it comprises] comprising a tensioning cable [(6)] attached to or comprising the lanyard [(4,6,10)].
4. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to claim 3 [characterised in that,] whereby when in use, the tensioning cable [(6)] is wound up onto and unwound from a reel [(8)] which is spring biased to wind up the cable [(6)].
5. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to claim 4 [characterised in that it comprises] comprising a mounting bracket [(44)], a housing [(2)] for the reel [(8)] and a flexible conduit [(52)] extending between the bracket [(44)] and the housing [(2)] and through which the tensioning cable [(6)] runs.
6. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to claim 4 [or 5 characterised in that it comprises] comprising a ratchet mechanism [(12,16)] which can be set to resist rotation of the reel [(8)] in the unwinding direction, thereby resisting paying out of the lanyard [(4,6,10)], but additionally and alternatively can be reset to resist rotation of the reel [(8)] in the winding up direction, thereby allowing paying out of

the lanyard [(4,6,10)] and resisting pulling in of the lanyard [(4,6,10) whilst] while a snatch connection [(7,9)] is made up.

7. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to claim 6 [characterised in that] whereby it is biased towards the set condition and is moved to the reset condition by rotation of a key [(20)] inserted into the assembly, counter rotation of the inserted key [(20)] being resisted by a further ratchet mechanism [(34,36,37)].

8. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to [any preceding] claim 1 [, characterised in that it comprises] comprising a brake [(48,54,55)] operable to resist paying out of the lanyard [(4,6,10)] at above a predetermined speed.

9. (Amended) A [snatch disconnection] lanyard assembly [(2,4,6,10,44,52)] according to [any preceding] claim 1 [characterised by] comprising a resilient link [(4)] connected to the lanyard [(6,10)], opposed parts of the link [(4)] each carrying abutment faces [(40)], the respective abutment faces [(40)] on either side being brought into contact with each other when the link [(4)] has been deformed by a predetermined amount.

10. (Amended) A lanyard assembly [(2,4,6,10,44,52)] as defined in claim 9 [characterised in that] in which the abutments [(40)], when in contact, transmit tensile loads applied to the connector opposed parts [(7,9)].

11. (Amended) A lanyard assembly [(2,4,6,10,44,52)] according to claim 9 [or 10 characterised in that] in which the lanyard has a plurality of ends [(10)] attached to a connector half [(7)] at spaced circumferential locations, the link [(4)] comprising a spreader bar connected between a tensioning cable [(6)] and the lanyard.

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Snatch Disconnection Lanyard

This invention relates to snatch connectors providing connection/disconnection of electrical or fluid circuits extending between two separable bodies. For example a snatch connector may be employed to connect a refrigeration unit or charging circuit on a road vehicle to a fixed (stationary) power supply, ensuring safe disconnection of the electrical power if the vehicle is inadvertently driven away without first manually disconnecting the circuit. Other applications for snatch connectors include:-

- 1) connecting ship to shore service lines
- 2) emergency disconnect packages, connectors and interfaces for ROV (remote operated vehicle) manipulation, used in subsea oil and gas production
- 3) electrical connections for loads dropped or ejected from aircraft or other moving vehicles.

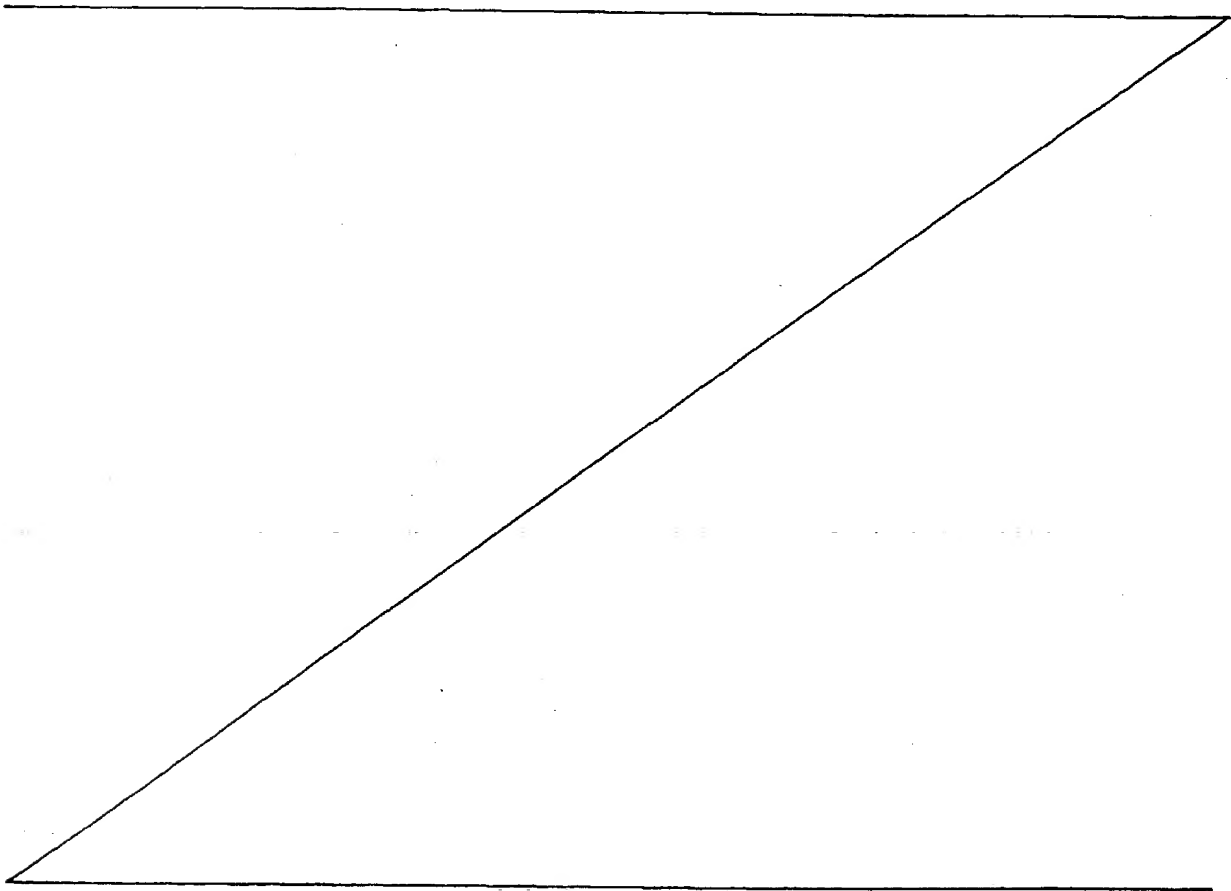
It is necessary for these connectors to be positively and safely separated to avoid damage to the electrical/fluid circuit and its anchoring points on the separated bodies. This function is normally achieved by firmly securing a first half of the connector to a first one of the bodies and fitting the second half of the connector at the end of a flexible cable or conduit leading to the second body. A lanyard loop is then secured between a fixed strong-point on the second body and the connector second half, so that as the bodies separate, the lanyard is tensioned and releases a spring loaded coupling sleeve on the connector, thereby allowing the two halves to separate. The length of the lanyard loop is shorter than the cable or conduit, which is therefore not subjected to excessive strain as the connector halves are pulled apart.

A similar arrangement is disclosed in US-A-4134634 (Bauer et al), which concerns a tow cable connector for helicopters, in which a fixed lanyard is used. The tow cable is paid out from a winch. When winch torque is overcome, the cable extends and the lanyard releases the tow connector.

In DE-U-9406232.3 (Erich Jaeger) a snatch connector is shown, having a connector latch linked to a coiled part of a connecting cable, using a fixed length lanyard. Stretching of the coiled part pulls the lanyard taut and releases the connector latch.

1A

In some applications, for example where the first body is a variable load releasable from an aircraft, the second connector half may have to co-operate with a variety of different first connector halves, in various different connected positions, for different loads. In such cases it
5 can be difficult to fit the lanyard to ensure proper disconnection whatever the load. Depending upon the type of load it may prove necessary to change the length of the lanyard and the location of the strong-point, entailing major structural changes to the aircraft. It may also be important to provide for stowage of the cable/conduit and lanyard after separation of the connector halves, e.g. to prevent damage in a vehicle's slipstream or by dragging on the
10 ground.



The present invention provides a snatch disconnection lanyard assembly comprising a tensioner characterised in that the tensioner may be set to allow paying out of the lanyard or set to pull in the lanyard and when set to pull in, will resist paying out of the lanyard, thereby providing a tensile force for snatch disconnection. To allow the lanyard and an associated connector half to be coupled to a co-operating connector half in a variety of different possible positions, the tensioner is set to allow paying out the lanyard. Preferably when so set, pulling in of the cable by the tensioner is resisted, maintaining slack in the lanyard for ready mating of the connector halves. Once the connection has been made up, the tensioner can be set to pull in, whereupon the slack in the lanyard is taken up and the lanyard is maintained under slight tension. This tension is however designed to be at a level insufficient to separate the connector halves. Then when the tensioner, lanyard and its associated connector half are moved bodily away from the other connector half, paying out of the lanyard is resisted and tension in the lanyard increases to the point where the connector halves are pulled apart.

Where for example the connector halves are respectively attached to a vehicle and its load, because the lanyard is maintained under tension, inertial movements of the load relative to the vehicle or aerodynamic forces acting on the load could cause premature disengagement of the connector. To help prevent this, a resilient link is connected to the lanyard, opposed parts of the link each carrying abutment faces, the respective abutment faces on either side being brought into contact with each other when the link has been deformed by a predetermined amount, thereby increasing the stiffness of the link and allowing transmission of snatch disconnection forces. The link allows limited relative movement of the vehicle and its load prior to engagement of the abutments.

Preferred features of the invention are in the dependent claims and also in the following illustrative description, made with reference to the drawings in which:-

Fig. 1 is a perspective view of a snatch disconnection lanyard assembly embodying the invention;

Fig. 2 is an exploded perspective view of a cable reel housing of the lanyard assembly of fig. 1, and its internal components;

5 Fig. 3 is a plan view of the cable reel ratchet mechanism in its set condition;

Fig. 4 is a plan view of the cable reel ratchet mechanism in its reset condition;

Figs. 5 and 6 show additional details of the ratchet mechanism;

Fig. 7 shows a hexagonal key hole and an associated further ratchet mechanism, and

Figs. 8 and 9 show a centrifugal brake for the reel.

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Referring to figs. 1 and 2 the tensioner assembly comprises a spreader bar (4) on a miniature wire rope, or cable (6), which is attached to a reel (8, fig.2) formed from two halves (8a,8b) within a housing (2). As shown in fig.2 the housing includes a base (3) and a cover (5). The spreader bar ensures that the connector snatch lanyard (10) is tensioned substantially
15 parallel to its disengagement direction. This approach ensures minimal snatch disengagement forces and maximum snatch lanyard life. Ends of the lanyard (10) are connected at diametrically opposed positions to a connector half (7). A complementary mating connector half (9) is firmly mounted to a releasable load (32). The connector half (9) is fixed to the end of a flexible wiring harness (11).

20

As best seen in fig. 2, the reel (8) is rotationally spring loaded by a coiled 'clockspring' (14) extending between a fixed spindle (13) and a reel slot (15). Thus the cable (6) is normally under tension as the spring attempts to wind it further onto the reel. It will be apparent that the cable cannot act as a fixed anchor-point unless the reel is prevented from
25 rotating in the reverse direction. This function is provided by an escapement pawl, or latch, (16) which engages with a toothed wheel (12) rigidly coaxially attached to the reel.

The escapement latch is designed to be spring biased in either direction, dependent on the rotational position of a manually operated lever (18) which is rotated by a hexagonal
30 key (20, fig. 7) inserted into a matching socket (22) in the lever's shaft. In the position shown in fig. 3, the reel will allow cable to be paid out from the reel with the latch preventing its

return; whereas in fig 4, the spring tension is applied to the cable, and the reel will resist any attempt to pull out more cable. This latter role provides the desired anchor-point function. The lever is biased to the fig. 4 position by a spring loaded plunger (24) acting on a horn (25) formed on the latch housing (26). The latch housing has, between it and the latch, a torsion spring (28) which provides the spring compliance necessary to allow the latch to be bypassed in one direction at a time, depending on the position of the manually operated lever. In effect, this provides the function of a ratchet which may be set to operate in either direction.

It will be apparent that the fig. 3 position of the latch is useful for allowing the flexible wiring harness and its attached connector half to be pulled out of its storage position, for example from a pylon suspended beneath an aircraft, and attached to the other connector half (9) fixed to the load (32). Should the operator inadvertently release the wiring harness during this process but prior to attachment to the load, the harness will not retract back into the pylon. The fig. 3 position of the latch can only be obtained by full insertion of the key into the hexagonal socket (22) in the operating lever, followed by clockwise rotation of the key and lever (viewed from the key access point).

A detent action on the key prevents reverse rotation of the lever when the key is inserted and turned. This function is achieved by means of a separate collar (34) axially coincident with the operating lever, and featuring a matching key socket.

The collar can only be rotated in one direction (clockwise), and is prevented from rotating in the opposite direction by a slidable spring loaded pin (36) which engages a series of wedge shaped recesses (37) machined in the periphery of the collar. So long as the key is rotated and left in place, the latch will therefore remain biased to the paying out mode.

Once the wiring harness has been attached to the load, the key is removed from the socket in the operating lever, and this action allows separate rotation of the lever relative to the collar, and enables the latch to return to the position in which it allows the clockspring to apply a retraction tension to the cable, and at the same time to prevent any pay-out of cable.

Thus the fully installed wiring harness is held in place, and the cable then acts as a strong point, disconnecting the snatch connector in the event of downward motion of the connector during load release.

5 In order to prevent inadvertent disconnection which might be caused by normal aerodynamically and/or inertially induced load movements which routinely occur during captive carriage, the cable termination spreader (4) is designed to flex slightly, allowing a small amount of downward load movement before becoming substantially rigid and transferring disconnection loads to the lanyard. This effect is obtained by shaping the
10 spreader so that it may bend under nominal lanyard tensions until abutment faces (40) contact each other, whereupon a sudden increase in bending stiffness occurs. In one embodiment of the concept, this contact, and its consequential stiffening effect, are designed to occur at approximately 5mm of downward movement of the lanyard ends, but this principle may be employed to suit other particular requirements.

15 To provide optimum versatility of location of the reel assembly relative to the wiring harness and connector halves, the cable in the preferred embodiment is slidably contained within a flexible sheath (52), in the manner of a bicycle brake cable, so that it may be routed past obstacles without risk of chafing. In this application, the sheath is terminated by an
20 abutment (42) at the reel housing and a load bearing bracket, or strong-point (44) which is firmly attached to the pylon structure by removable pins (46) which enable its position to be re-sited to align with different load connector positions.

In view of the importance attached to successful operation of the snatch function, a
25 secondary mechanism is incorporated within the reel assembly, so that failure of the latch to prevent rotation of the reel during load release, is rapidly backed up by alternative locking of the reel via a centrifugally energised pair of sears (48) which lock the reel to the housing cover (5) when the reel rotates at some predetermined velocity. During load ejection, large accelerations are encountered, so a downward velocity of (say) 0.4m/sec would be achieved
30 within 5mm of downward motion of the load. This corresponds to a rotational velocity of the reel of approximately 250rpm, which would be ample to operate the centrifugal brake. The

sears are normally held out of engagement with the housing, by springs (54). Fig. 7 shows the sears disengaged from the housing cover, allowing rotation of the reel; whereas fig.9 shows the sears engaged with abutment faces (55) in the cover (5), thereby preventing rotation of the reel.

5

In its preferred forms, use of the invention may include the following advantages:-

- a) It may provide a single adjustable strong-point for the snatch connector lanyard.
- b) It preferably applies a continuous but moderate tension to the snatch connector lanyard.
- c) It enables the wiring harness to be attached to the load without disconnecting the
10 snatch lanyard from the anchor-point.
- d) It preferably ensures that the snatch tension in the connector lanyard is minimised.
- e) It may help to ensure that the anchor-point is as far away from the load as possible, thereby reducing the amount by which the wiring harness is pulled out from its stowed position during load release, and reducing risk of damage to both the harness and its
15 surrounding structure.
- f) It advantageously withdraws the harness as far as possible back to its stowed position after load release.
- g) It may help to achieve foolproof operation by encouraging only the correct sequence of actions.
- 20 h) It may provide a back-up operation mode in the event of primary latch failure.

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Claims:-

1. A snatch disconnection lanyard assembly (2,4,6,10,44,52) comprising a tensioner (2), characterised in that the tensioner (2) may be set to allow paying out of the lanyard (4,6,10) or set to pull in the lanyard (4,6,10) and when set to pull in, will resist paying out of the lanyard (4,6,10), thereby providing a tensile force for snatch disconnection.
2. A lanyard assembly (2,4,6,10,44,52) as defined in claim 1 characterised in that, when the tensioner (2) is set to allow paying out the lanyard (4,6,10), pulling in of the lanyard (4,6,10) by the tensioner (2) is resisted.
3. A lanyard assembly (2,4,6,10,44,52) as defined in claim 1 or 2 characterised in that it comprises a tensioning cable (6) attached to or comprising the lanyard (4,6,10).
4. A lanyard assembly (2,4,6,10,44,52) according to claim 3 characterised in that, in use, the tensioning cable (6) is wound up onto and unwound from a reel (8) which is spring biased to wind up the cable (6).
5. A lanyard assembly (2,4,6,10,44,52) according to claim 4 characterised in that it comprises a mounting bracket (44), a housing (2) for the reel (8) and a flexible conduit (52) extending between the bracket (44) and the housing (2) and through which the tensioning cable (6) runs.
6. A lanyard assembly (2,4,6,10,44,52) according to claim 4 or 5 characterised in that it comprises a ratchet mechanism (12, 16) which can be set to resist rotation of the reel (8) in the unwinding direction, thereby resisting paying out of the lanyard (4,6,10), but additionally and alternatively can be reset to resist rotation of the reel (8) in the winding up direction, thereby allowing paying out of the lanyard (4,6,10) and resisting pulling in of the lanyard (4,6,10) whilst a snatch connection (7,9) is made up.

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7. A lanyard assembly (2,4,6,10,44,52) according to claim 6 characterised in that it is biased towards the set condition and is moved to the reset condition by rotation of a key (20) inserted into the assembly, counter-rotation of the inserted key (20) being resisted by a further ratchet mechanism (34,36,37).

5

8. A lanyard assembly (2,4,6,10,44,52) according to any preceding claim, characterised in that it comprises a brake (48,54,55) operable to resist paying out of the lanyard (4,6,10) at above a predetermined speed.

10 9. A snatch disconnection lanyard assembly (2,4,6,10,44,52) according to any preceding claim characterised by a resilient link (4) connected to the lanyard (6,10), opposed parts of the link (4) each carrying abutment faces (40), the respective abutment faces (40) on either side being brought into contact with each other when the link (4) has been deformed by a predetermined amount.

15

10. A lanyard assembly (2,4,6,10,44,52) as defined in claim 9 characterised in that the abutments (40), when in contact, transmit tensile loads applied to the connector opposed parts (7,9).

20 11. A lanyard assembly (2,4,6,10,44,52) according to claim 9 or 10 characterised in that the lanyard has a plurality of ends (10) attached to a connector half (7) at spaced circumferential locations, the link (4) comprising a spreader bar connected between a tensioning cable (6) and the lanyard.

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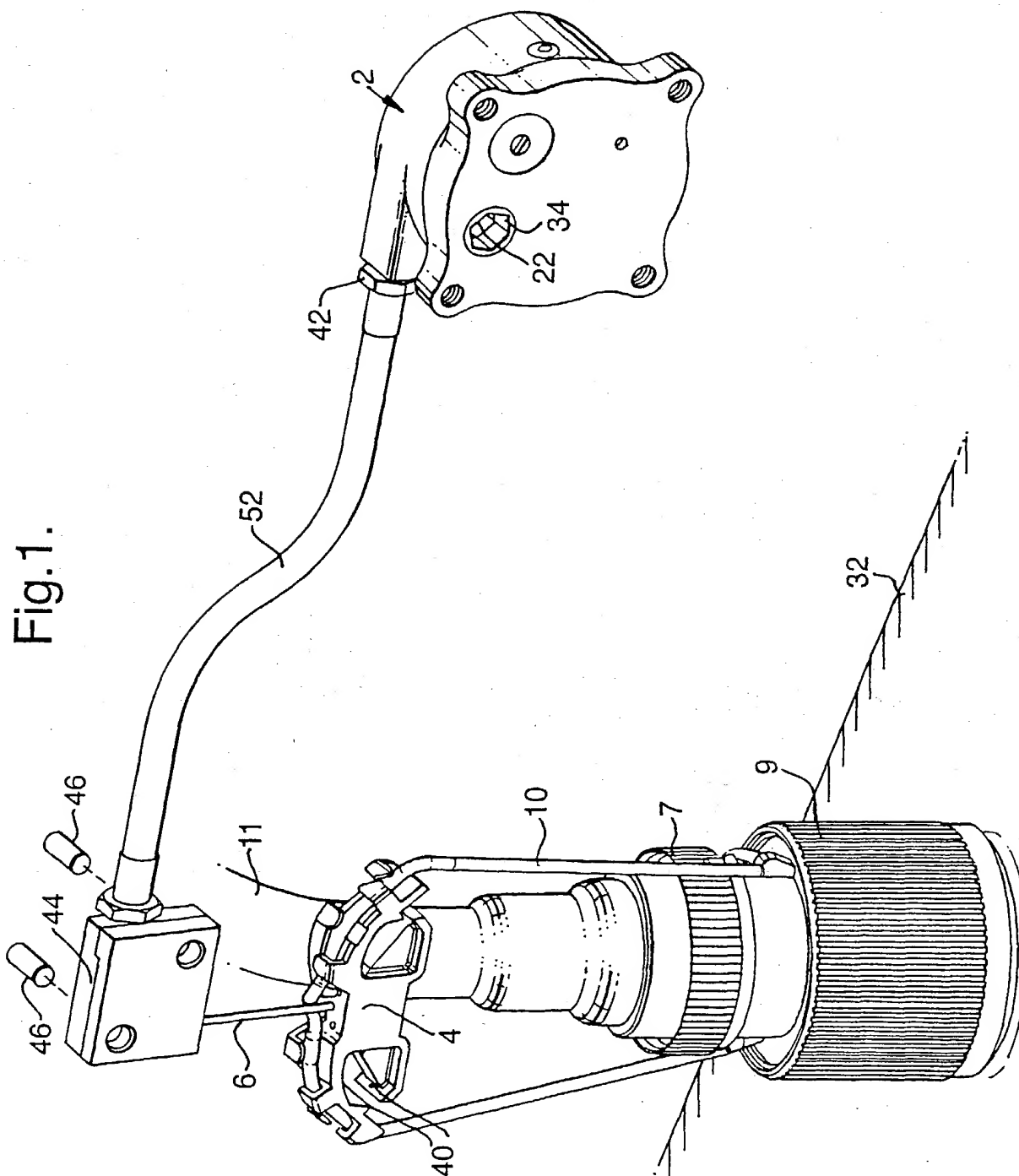


Fig.2.

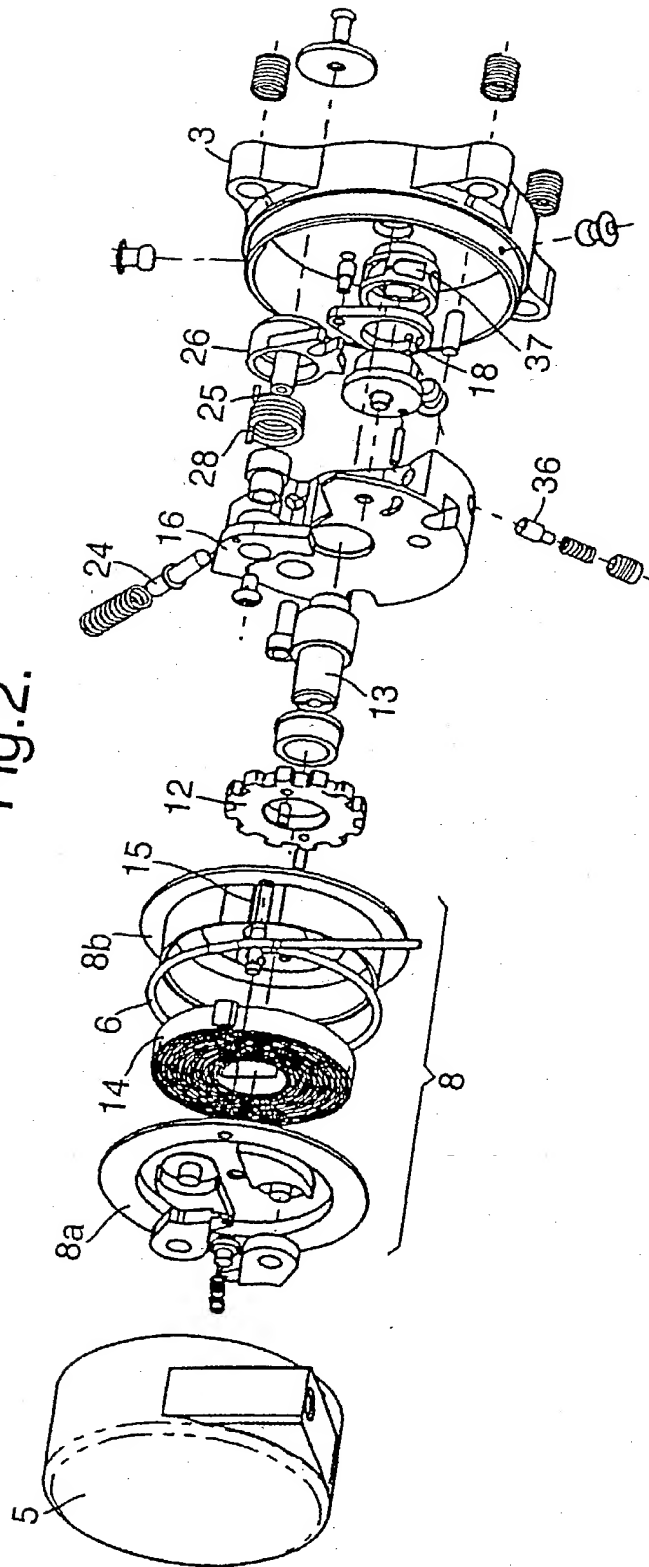


Fig.3.

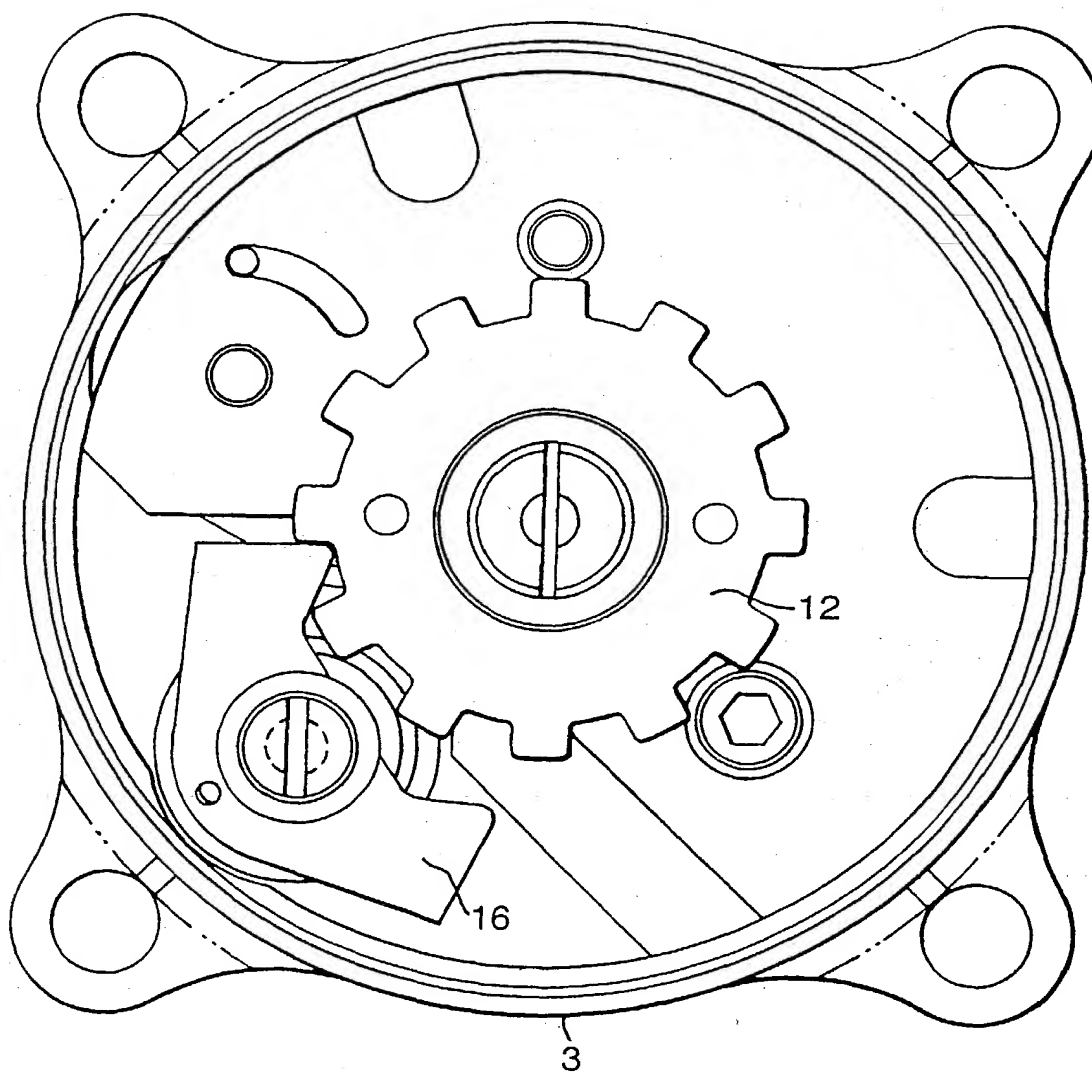


Fig.4.

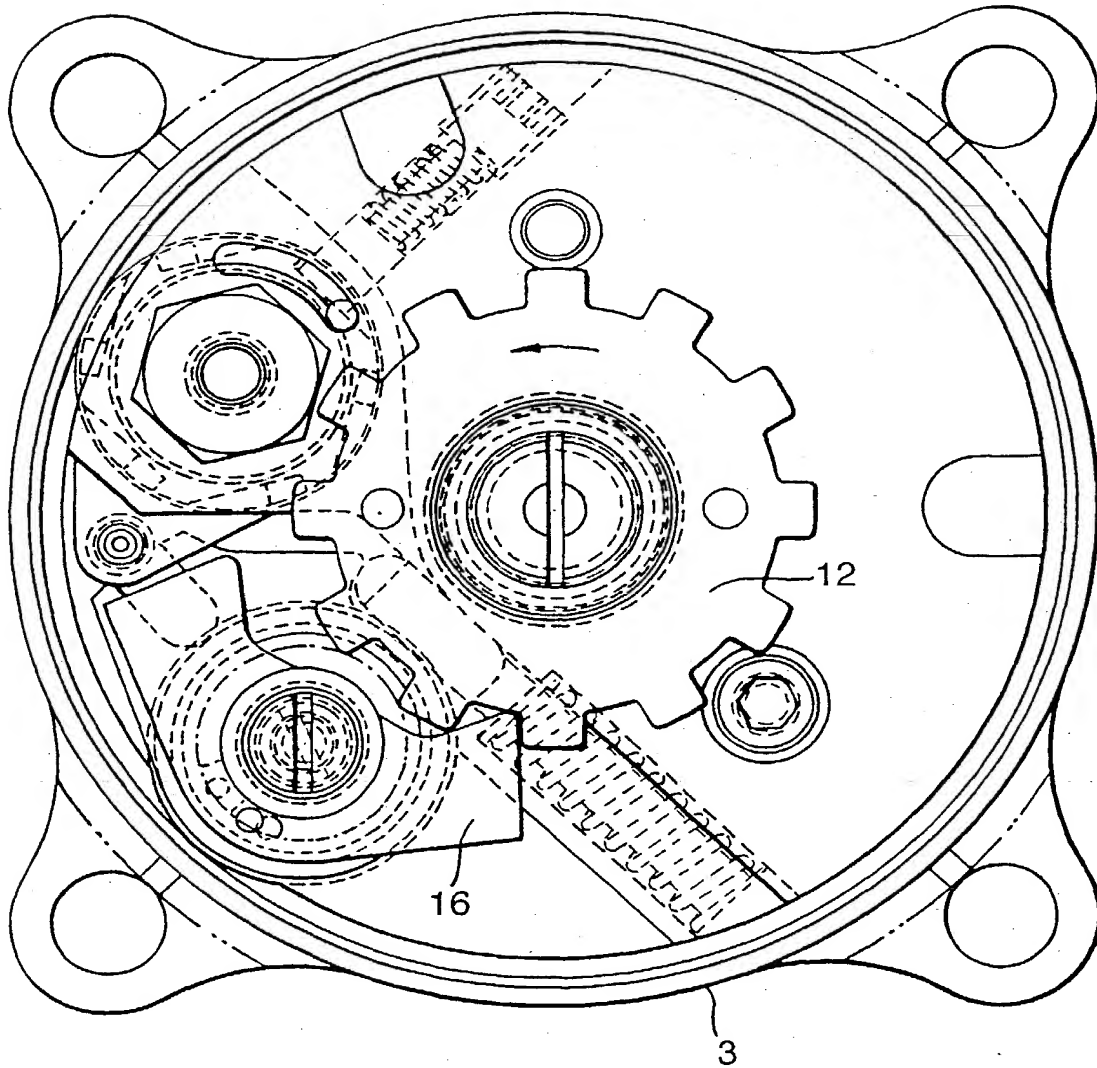


Fig.5.

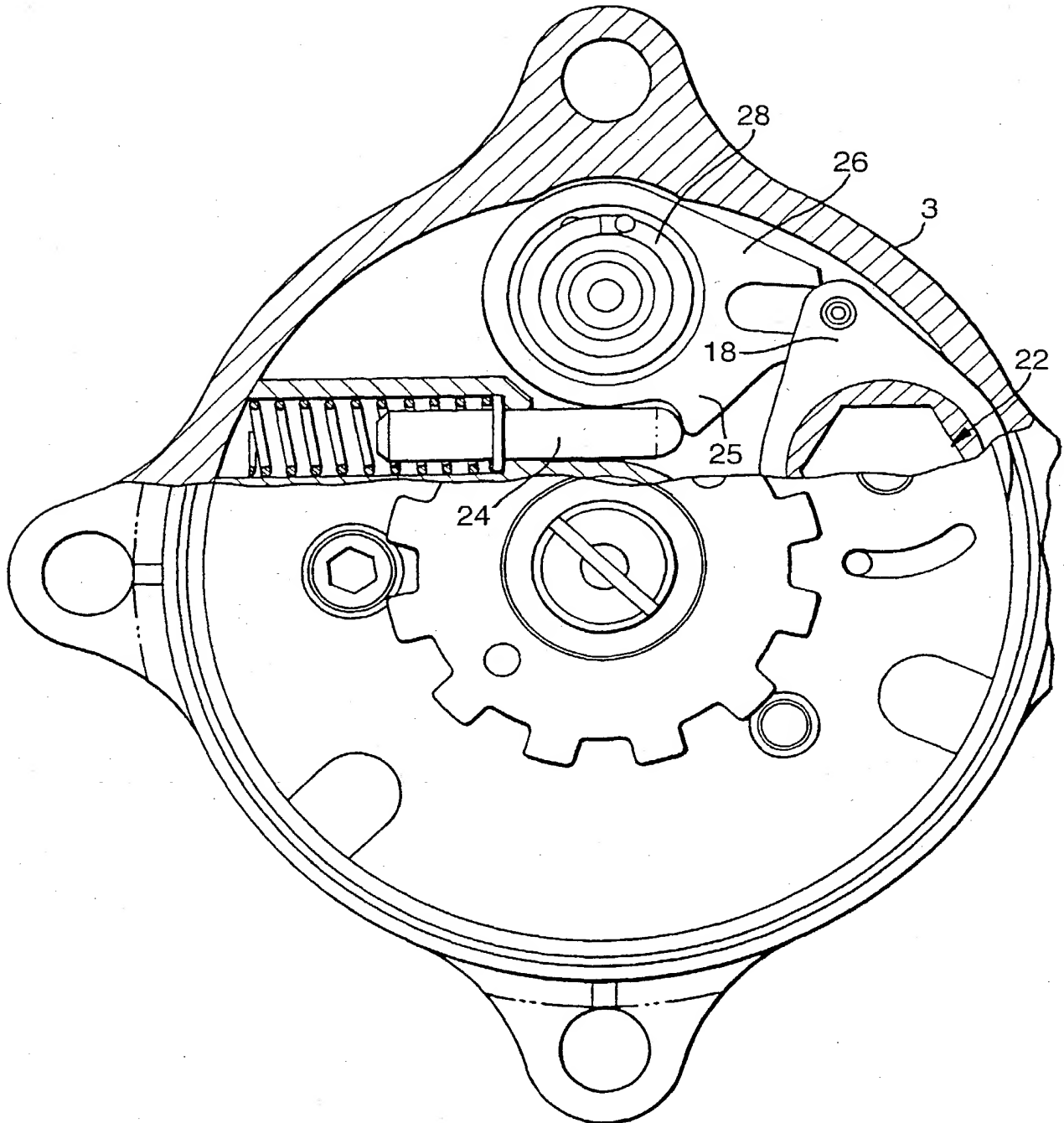


Fig.6.

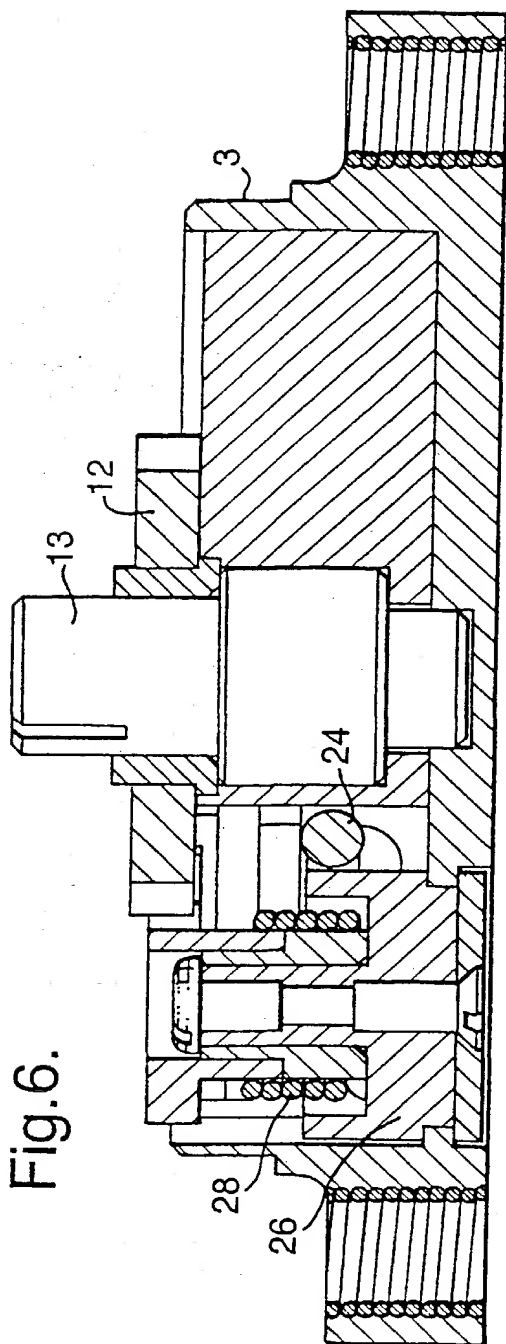


Fig.7.

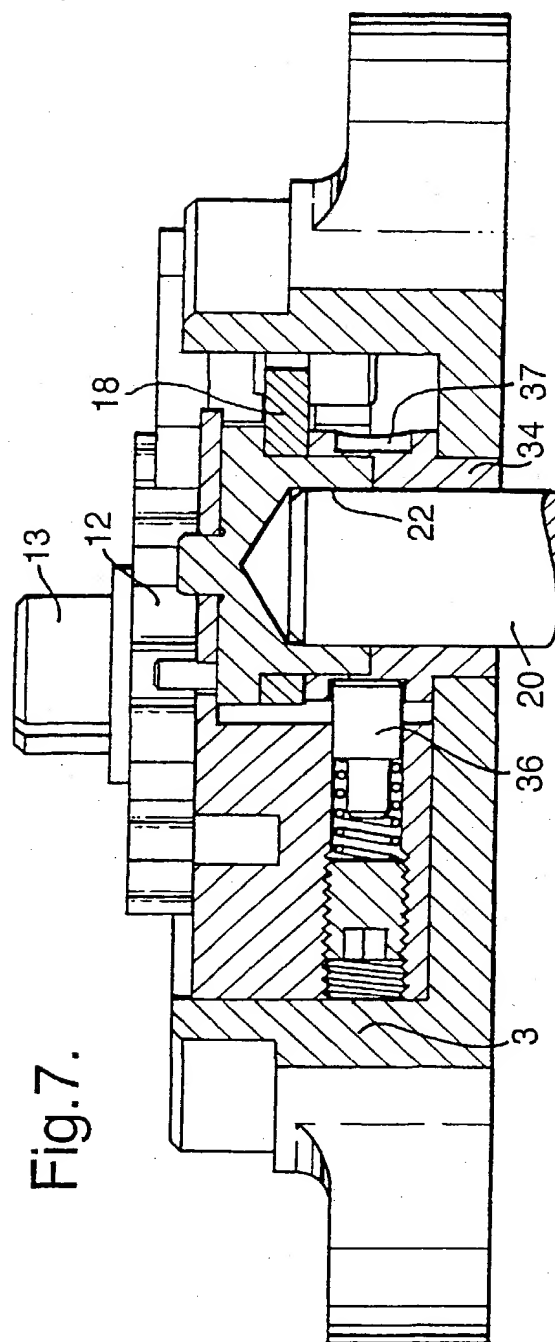
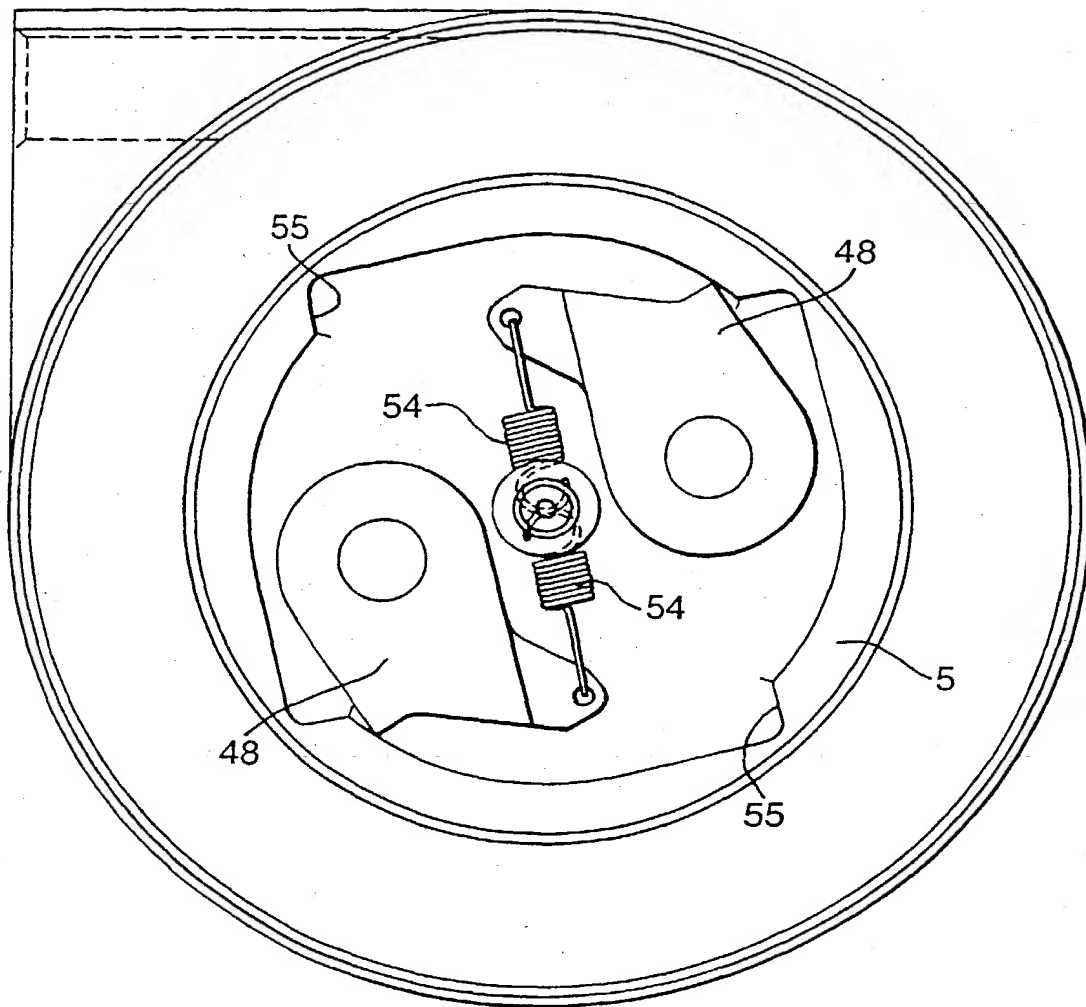


Fig.8.



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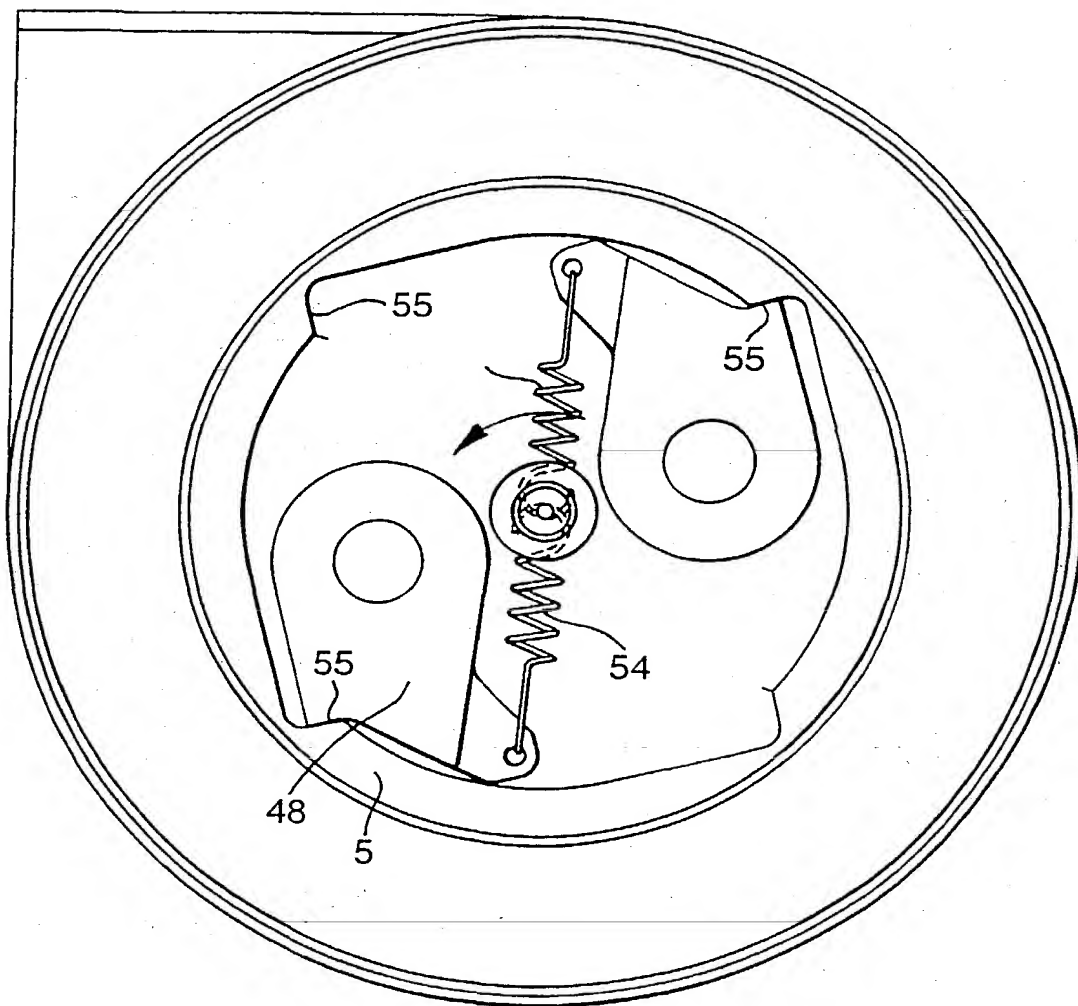
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PCT/GB00/00141

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Fig.9.



DECLARATION FOR PATENT APPLICATION

☒ Original

☐ Supplemental

☐ Substitute

☐ PCT

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below), or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Snatch Disconnection Lanyard

(Title of the Invention)

the specification of which (check one)

☐ is attached hereto

☒ was filed on 11 January 2000 as International Application Number PCT/GB00/00141
and was amended 24 November 2000 (Article 34)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 (a) - (d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified, by checking the box below, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications			Priority Claimed		Copy Attached	
Application Number	Country	Foreign Filing Date (MM/DD/YYYY)	YES	NO	YES	NO
9900543.1	GB	01/11/99 (January 11, 1999)	x			x

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below and claim the benefit under Title 35, United States Code, § 120 of any United States application(s), or § 365(c) of any PCT international application(s) designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Express Mail Label No. EL209598595US
U.S. National Phase of PCT/GB00/00141
Inventors: Michael James CRUTTENDEN, et al.
Filed: 06 July 2001
For: "Snatch Disconnection Lanyard"
Declaration for Patent Application
Page 2

Parent Application Number	Filing Date	Status (Mark Appropriate Column Below)		
		Patented	Pending	Abandoned

As a named inventor, I hereby revoke all prior powers and appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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Page 3

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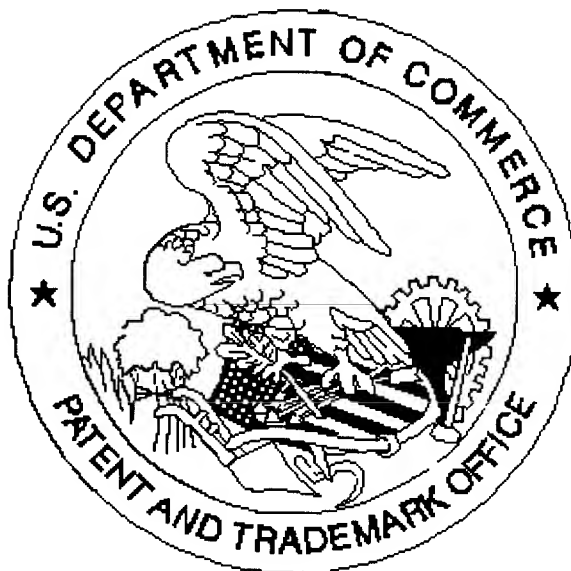
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